

FORM PTO-1390 (REV. 1-98)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER M8540/185343	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (If known, see 37 CFR 1.8) 09/202758	
INTERNATIONAL APPLICATION NO. PCT/GB97/01667		INTERNATIONAL FILING DATE 20 June 1997 (20.06.97)		PRIORITY DATE CLAIMED 21 June 1996 (21.06.96)	
TITLE OF INVENTION SALINE SOLUBLE INORGANIC FIBRES					
APPLICANT(S) FOR DO/EO/US JUBB, Gary Anthony, EATON, Paul Nigel, CANTY, Philip John, WASSELL, Alison Jane (formerly LOWE, Alison Jane)					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 37 (b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as published (35 U.S.C. 371(c)(2)) a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.197 and 1.98 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: Copy of International Preliminary Examination Report with replacement pages 1 and 2 of Description and pages 9-11 of Claims Form PCT/IB/306 changing name of Inventor Alison Jane Wassell Form PCT/IB/306 changing address of Inventor Gary Anthony Jubb Certificate of Mailing under Express Mail Label No. EM216268121US					


U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO. PCT/GB97/01667	ATTORNEY'S DOCKET NUMBER M8540/185343
17. <input checked="" type="checkbox"/> The following fees are submitted BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1070.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$930.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$790.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$720.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$98.00 ENTER APPROPRIATE BASIC FEE AMOUNT = \$930.00		CALCULATIONS PTO USE ONLY
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). \$		
CLAIMS	NUMBER FILED	NUMBER EXTRA
Total claims	08 - 20 = 00	X \$18.00
Independent claims	04 - 03 = 01	X \$78.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+ \$260.00
TOTAL OF ABOVE CALCULATIONS =		\$1,008.00
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28)		\$
SUBTOTAL =		\$1,008.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		\$
TOTAL NATIONAL FEE =		\$1,008.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property		\$ 40.00
TOTAL FEES ENCLOSED =		\$1,048.00
		Amount to be refunded: \$
		charged: \$

- a. ☒ A check in the amount of \$1,048.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 11-0855 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0855. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

John S. Pratt, Esq.
KILPATRICK STOCKTON LLP
1100 Peachtree Street, Suite 2800
Atlanta, Georgia 30309-4530



SIGNATURE

Name: Bruce D. Gray
Registration No. Reg. No 35,799

09/202758

300 Rec'd PCT/PTO 21 DEC 1998

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
(DO/EO/US)

Applicants: Gary Anthony Jubb,
Paul Nigel Eaton,
Philip John Canty,
and Alison Jane
Wassell (nee Alison
Jane Lowe)

International
Application No. PCT/GB97/01667

GROUP ART UNIT:

International
Filing Date: 20 June 1997

EXAMINER:

U.S. Filing Date 21 December 1998

FOR: SALINE SOLUBLE INORGANIC FIBRES

ATTORNEY DOCKET NO.:
M8540/185343

Box PCT
Assistant Commissioner for
Patents
Washington, D.C. 20231

DATE: 21 December 1998

PRELIMINARY AMENDMENT

Sir:

Preliminary to any examination on the merits, Applicants respectfully submit the following amendments and remarks in connection with the above-identified application.

IN THE CLAIMS

Please cancel claims 1-7 without prejudice or disclaimer to the subject matter contained therein.

Please add the following new claims.

--8. A method of increasing the refractoriness of inorganic fibers having a composition containing SiO_2 and CaO , or SiO_2 , CaO , and MgO , comprising:

(1) including in the fiber composition a P_2O_5 former in an amount such that:

(a) $\{\text{SiO}_2\} + (\{\text{P}_2\text{O}_5\} - (58 + 0.5(\{\text{MgO}\} - 10))) > -2.4 \text{ wt\%}$ if $\{\text{MgO}\} > 10 \text{ wt\%}$;

and

(b) $\{\text{SiO}_2\} + (\{\text{P}_2\text{O}_5\} - 58) > -2.4 \text{ wt\%}$ if $\{\text{MgO}\} \leq 10$; and optionally

(2) including in the fiber composition a B_2O_3 former such that $\{\text{B}_2\text{O}_3\}$ is in the range from 0 to 4 wt%;

wherein $\{\text{SiO}_2\}$, $\{\text{P}_2\text{O}_5\}$, $\{\text{MgO}\}$, and $\{\text{B}_2\text{O}_3\}$ are the concentrations of SiO_2 , P_2O_5 , MgO , and B_2O_3 , respectively, in the fiber in wt%;

thereby producing inorganic fibers having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours.--

--9. The method according to claim 8, wherein the fiber has a percentage of nonbridging oxygens, calculated based upon the above-named components, of less than 64.1%.--

--10. The method according to claim 8, wherein the fiber compositions contain concentrations of SiO_2 , CaO , and optionally MgO , P_2O_5 , and B_2O_3 falling within the ranges:

$\{\text{SiO}_2\}$ 44 wt% or more;

$\{\text{CaO}\}$ 20 - 40 wt%;

$\{\text{MgO}\}$ 0 - 18 wt%;

$\{\text{P}_2\text{O}_5\}$ 0 - 12.5 wt%; and

$\{\text{B}_2\text{O}_3\}$ 0 - 4 wt%

wherein $\{\text{CaO}\}$ is the concentration of CaO in the fiber in wt%.--

--11. The method according to claim 10, wherein the fiber compositions contain concentrations of SiO_2 , CaO , P_2O_5 , and optionally MgO and B_2O_3 falling within the ranges:

$\{\text{SiO}_2\}$	52 wt% to 58 wt%, when $\{\text{MgO}\} \leq 10$ wt%, and 52 wt% to $(58 + 0.5(\{\text{MgO}\} - 10))$ wt%, when $\{\text{MgO}\} > 10$ wt%;
$\{\text{CaO}\}$	22 wt% to 40 wt%;
$\{\text{MgO}\}$	0 wt% to 17.5 wt%;
$(\{\text{MgO}\} + \{\text{CaO}\})$	< 42 wt%;
$\{\text{P}_2\text{O}_5\}$	0.5 wt% to 10 wt%;
$\{\text{B}_2\text{O}_3\}$	0 wt% to 2 wt%.--

--12. The method according to claim 10, wherein the fiber compositions contain concentrations of SiO_2 , CaO , MgO , and optionally P_2O_5 and B_2O_3 falling within the ranges:

$\{\text{SiO}_2\}$	44.34 wt% to 62.48 wt%;
$\{\text{CaO}\}$	20.36 wt% to 39.4 wt%;
$\{\text{MgO}\}$	0.62 wt% to 21.16 wt%;
$\{\text{P}_2\text{O}_5\}$	0 wt% to 12.01 wt%;
$\{\text{B}_2\text{O}_3\}$	0 wt% to 3.54 wt%.--

--13. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO_2 , CaO , P_2O_5 , and optionally MgO and B_2O_3 in concentrations falling within the ranges:

$\{\text{SiO}_2\}$	52 wt% to 58 wt%, when $\{\text{MgO}\} \leq 10$ wt%, and 52 wt% to $(58 + 0.5(\{\text{MgO}\} - 10))$ wt%, when $\{\text{MgO}\} > 10$ wt%;
--------------------	--

{CaO}	22 wt% to 40 wt%;
{MgO}	0 wt% to 17.5 wt%;
{MgO} + {CaO}	< 42 wt%;
{P ₂ O ₅ }	0.5 wt% to 10 wt%; and
{B ₂ O ₃ }	0 wt% to 2 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, and {B₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, and B₂O₃, respectively, in the fiber in wt%, and wherein

(a) $\{SiO_2\} + (\{P_2O_5\} - (58 + 0.5(\{MgO\} - 10))) > -2.4 \text{ wt\%}$ if $\{MgO\} > 10 \text{ wt\%}$;

and

(b) $\{SiO_2\} + (\{P_2O_5\} - 58) > -2.4 \text{ wt\%}$ if $\{MgO\} \leq 10$; and

wherein the percentage of nonbridging oxygens calculated based upon the above-named components is less than 61.4%.--

--14. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO₂, CaO, MgO, and optionally P₂O₅ and B₂O₃ in concentrations falling within the ranges:

{SiO ₂ }	44.34 wt% to 62.48 wt%;
{CaO}	20.36 wt% to 39.4 wt%;
{MgO}	0.62 wt% to 21.16 wt%;
{P ₂ O ₅ }	0 wt% to 12.01 wt%;
{B ₂ O ₃ }	0 wt% to 3.54 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, and {B₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, and B₂O₃, respectively, in the fiber, and wherein

(a) $\{SiO_2\} + (\{P_2O_5\} - (58 + 0.5(\{MgO\} - 10))) > -2.4 \text{ wt\%}$ if $\{MgO\} > 10 \text{ wt\%}$;

and

(b) $\{SiO_2\} + (\{P_2O_5\} - 58) > -2.4 \text{ wt\%}$ if $\{MgO\} \leq 10$.--

--15. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO₂, CaO, MgO, P₂O₅, and optionally B₂O₃, and Al₂O₃ in concentrations falling within the ranges:

{SiO ₂ }	52.4 wt% to 57.85 wt%;
{CaO}	22.2 wt% to 39.4 wt%;
{MgO}	1.96 wt% to 17.4 wt%;
{P ₂ O ₅ }	0.82 wt% to 7.8 wt%;
{B ₂ O ₃ }	0 wt% to 1.95 wt%; and
{Al ₂ O ₃ }	< 1 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, {B₂O₃}, and {Al₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, B₂O₃, and Al₂O₃, respectively, in the fiber in wt%,

(a) $\{SiO_2\} + (\{P_2O_5\} - (58 + 0.5(\{MgO\} - 10))) > -2.4 \text{ wt\% if } \{MgO\} > 10 \text{ wt\%};$

and

(b) $\{SiO_2\} + (\{P_2O_5\} - 58) > -2.4 \text{ wt\% if } \{MgO\} \leq 10.--$

REMARKS

Applicants have replaced existing claims 1-7 with new claims 8-15 in order to more closely comply with U.S. claim format. These new claims are fully supported by the original claims, and thus no new matter has been added. Further, no restriction of the scope of the original claims was intended by this amendment.

An early and favorable action on the merits is earnestly solicited.

U.S. National Phase Entry of
International Application No. PCT/GB97/01667
Filed: 21 December 1998
PRELIMINARY AMENDMENT

Please charge any additional fees or credit any overpayment to Deposit Order Account
No. 11-0855.

Respectfully submitted,



Bruce D. Gray
Reg. No. 35,799

OF COUNSEL:

KILPATRICK STOCKTON LLP
Suite 2800
1100 Peachtree Street
Atlanta, Georgia, 30309-4530
404-815-6218
Attorney Docket No.: M8540/185343

09/202, 158

SALINE SOLUBLE INORGANIC FIBRES

This invention relates to saline soluble inorganic fibres.

Saline soluble inorganic fibres have been described in several patent specifications, see for example WO93/15028. Fibres are required to be soluble in saline solution so that inhaled or ingested fibres dissolve rather than providing a source of irritation or otherwise affecting health. WO93/15028 showed that fibres comprising SiO_2 , CaO and MgO and having a silica content of greater than 58% (or greater than 58% plus 0.5 times ($\text{wt}\%\text{MgO} - 10$) if $\text{MgO} > 10\text{wt}\%$) had suitable shrinkage characteristics at 800°C and 1000°C to be usable as refractory materials. A further feature of WO93/15028 was the use of the percentage of non-bridging oxygens present to predict the solubility of fibres in physiological saline solution.

Various subsequent applications have described the effect of P_2O_5 and B_2O_3 on solubility - see for example WO95/29135. P_2O_5 is alleged to have a solubilising effect on such fibres. WO93/22251 refers to use of P_2O_5 and Na_2O to improve solubility of fibres. WO89/12032 and DE 4417230 disclose fibres containing SiO_2 , CaO , MgO , and B_2O_3 .

The German government have proposed a fibre classification which turns on a variable K_1 which is defined as:

$$K_1 = \Sigma (\text{Na}, \text{K}, \text{B}, \text{Ca}, \text{Mg}, \text{Ba} - \text{oxide}) - 2 * \text{Al} - \text{oxide}$$

(the amounts of the oxides being expressed as weight %)

According to the proposed fibre classification if K_1 is greater than 40 the fibre requires no health warnings. If K_1 lies between 30 and 40 the fibre requires health warnings to be made. If K_1 is less than 30 more serious marking is required (it is labelled as a carcinogen). It is readily apparent that it is difficult to provide a high K_1 fibre ($K_1 > 40$) while still providing a refractory fibre like that of WO93/15028 ($\text{SiO}_2 > 58\text{wt}\%$), there being a very narrow window of compositions to meet.

As a result of investigating fibre compositions that may meet the fibre classification and yet still be refractory enough to meet the standard of WO93/15028 (shrinkage of less than 3.5% at both 800°C and 1000°C) the applicants have found that addition of P_2O_5 to compositions allows a broader range of refractory fibres to be produced than had previously been appreciated.

They have also found that B_2O_3 , previously thought to be extremely detrimental to refractoriness, has a similar, although lesser, effect and that both P_2O_5 and B_2O_3 may be used in the fibres of WO93/15028.

The applicants have found that the refractoriness of the P_2O_5 and B_2O_3 containing fibres of the present invention is dependent on the sum of the amounts of SiO_2 and P_2O_5 (expressed in wt%)

It appears that a further factor that may be important in determining the refractoriness of a fibre is the percentage of non-bridging oxygens. If this percentage is 61.4% or more (calculated on the basis of the amounts of the components SiO_2 , CaO , MgO , P_2O_5 , and B_2O_3) the fibres tend to fail shrinkage tests at 800°C and 1000°C (failure being defined as a shrinkage of 3.5% or more).

The scope of the invention is apparent from the claims in the light of the following description.

The percentage of non-bridging oxygens (%N.B.O.) is calculated by converting the weight percentages of SiO_2 , CaO , MgO , P_2O_5 , and B_2O_3 to molar amounts and inserting these amounts into the equation:-

$$\%N.B.O. = \frac{2 * (CaO + MgO + P_2O_5 + B_2O_3)}{(2 * SiO_2 + CaO + MgO + 5 * P_2O_5 + 3 * B_2O_3)} \times 100$$

The reason the amounts of CaO , MgO , P_2O_5 , and B_2O_3 are doubled in the numerator to this equation is that each contributes two non-bridging oxygens. The reason terms are multiplied in the denominator to this equation is to reflect the number of oxygen atoms each molecular formula possesses.

Table I shows the results of a first set of shrinkage and solubility tests on compositions comprising SiO_2 , CaO , MgO , P_2O_5 , and B_2O_3 as main

ingredients. In this table the analysed compositions are normalised to 100%. It is clear from these compositions that where the percentage of non-bridging oxygens calculated on the basis of the amounts of the above named components is greater than 61.4% (those fibres lying above line A of Table I) the fibres fail the shrinkage tests, having shrinkages of greater than 3.5% at either or both of 800°C and 1000°C.

WO93/15028 stressed the importance of alumina content and the fibres lying between lines B and A of Table I show that alumina contents of greater than 1wt% are damaging to the shrinkage properties of fibres.

The applicants have also found that the combined amount of CaO and MgO is important. Those fibres lying between lines C and B have a combined CaO and MgO content of greater than 42wt% and also fail the shrinkage tests:

The fibres below line C have a percentage of non-bridging oxygens less than 61.4%, an alumina content of less than 1wt%, and a combined CaO and MgO content of less than 42wt%. All of these fibres pass the shrinkage tests. These fibres fall within the compositional ranges:-

SiO ₂	52.4 - 57.85wt%
CaO	22.2 - 39.4wt%
MgO	1.96 - 17.4wt%
P ₂ O ₅	0.82 - 7.8wt%
B ₂ O ₃	0 - 1.95wt%
Al ₂ O ₃	<1wt%

The solubility results presented in Table I were obtained by the methods described in WO93/15028 and show a high solubility for all of the fibres produced.

It can be seen that all of the fibres below line C have a K_I of more than 35 and more than half have a K_I of more than 40.

Further testing resulted in the data presented in Table II. The data presented are as in table I but an additional column entitled deviation shows the result of looking to the difference between the sum of the SiO₂ and P₂O₅ contents and the SiO₂ amount predicted to be needed by WO93/15028 for a fibre to be refractory (shrinkage of less than 3.5% at both 800°C and 1000°C. The figure given is found by calculating the sum

$$\text{SiO}_2 + \text{P}_2\text{O}_5 - (58 + (\text{if MgO} > 10, 0.5 \times (\text{MgO} - 10) \text{ else } 0))$$

If this is less than -2.4wt% the fibres fail. The fibres that failed are shown in plain text, those that passed in bold text, and those that were difficult to form in italics.

More than 12.5wt% P_2O_5 is undesirable as it causes difficulties in making the fibres.

While the above description and the claims refer to P_2O_5 , B_2O_3 , SiO_2 , CaO and MgO it will be clear to the person skilled in the art that the pure materials need not be used and that provision of these components in combined form (e.g. provision of P_2O_5 in the form of mixed oxide phosphates) is part of the invention.

Table 1

Code	Chemical Composition (XRF - Weight percent)										KI	Shrinkage	Solubility (ppm)			Total	Co (MgO)	% NBO				
	CaO	MgO	P2O5	SiO2	Al2O3	K2O	B2O3	Fe2O3	ZnO	SnO			800°C	1000°C	CaO				MgO	SiO2	B2O3	
LTP8	24.95	19.18		3.41	0.25	0.30	0.05		0.17	<0.05	44.0	40.0	40.0	53	98	177		328	44.14	68.5%		
LTP9	24.81	18.66		5.10	0.42	0.38	0.31	<0.05	0.17	0.15	<0.05	43.0	23.9	38.8	59	115	191		367	43.47	68.1%	
LTP11	25.13	19.07		2.51	0.24	0.28	0.25	0.05	0.17	0.15	<0.05	43.9	46.8	39.1	55	94	174		323	44.20	68.0%	
LTP16	31.83	12.27		3.39	0.19	0.26	0.42	0.06	0.17	<0.05	<0.05	44.1	49.1		79	76	200		355	44.11	66.1%	
LTP10	24.48	17.89		2.48	0.46	0.21	0.28	0.05	0.16	<0.05	<0.05	42.3	3.62	19.1	58	90	169		317	42.77	64.7%	
LTP4	24.04	17.78		3.31	0.18	0.31	0.26	0.05	0.15	0.25	<0.05	41.5	3.71	4.77	56	95	180		331	41.83	64.3%	
LTP5	24.22	17.17		4.91	0.22	0.33	0.30	<0.05	0.14	0.21	<0.05	41.0	3.63	5.39	65	106	191		362	41.40	64.1%	
LTP17	38.39	5.54		3.41	0.12	0.40	0.42	0.07	0.16	0.38	<0.05	43.6	45.8	43.8	83	32	191		306	43.94	63.9%	
LTP23	38.62	5.56		2.57	0.22	0.34	0.46	0.07	0.15	<0.05	<0.05	44.0	42.90		82	29	199		310	44.18	63.7%	
LTP14	30.93	11.01		4.90	0.19	0.30	0.45	0.05	0.15	0.25	<0.05	41.8	3.24	3.92	78	69	191		338	41.95	63.0%	
LTP13	11.28	27.95		3.26	0.17	<0.05	0.13	<0.05	0.17	<0.05	<0.05	39.4	5.72	5.26	30	117	188		335	39.23	63.0%	
LTP12	30.93	11.35		3.36	0.32	0.32	0.31	0.06	0.15	<0.05	<0.05	42.0	2.55	30.1	82	72	207		361	42.27	62.6%	
LTP20	31.05	11.35		2.52	0.14	0.32	0.31	0.06	0.16	0.10	<0.05	42.1	3.38	29.7	85	71	200		356	42.40	62.6%	
LTP15	36.89	5.70		5.05	0.12	0.31	0.43	0.10	0.16	0.13	<0.05	42.5	3.41	5.03	88	35	204		327	42.59	62.2%	
LTP3	22.89	16.69		6.70	0.25	0.28	0.25	0.29	0.13	0.46	<0.05	39.4	23.3	29.5	43	166	141		350	39.58	61.9%	
LTP7	10.37	27.85		3.29	0.18	<0.05	0.15	<0.05	0.16	<0.05	<0.05	38.4	10.9	15.5	36	132	152		320	38.23	61.4%	
LTP22	24.9	11.5		4.89	0.16	0.28	0.05	<0.05	0.138	<0.05	<0.05	32.6	32.1		72	74	140		286	36.40	56.0%	
LTP41	28.7	11		1.62	0.66	0.38	0.29	0.07	<0.05	<0.05	<0.05	37.3	3.07	3.61	82	69	159		310	39.70	58.4%	
LTP29	40.29	2.09		1.23	0.5109	0.43	0.39	0.12	0.19	0.17	<0.05	42.0	45.9		76	10	206		292	42.38	58.8%	
LTP21	36.62	5.58		2.54	0.1419	0.39	0.46	0.07	0.15	<0.05	<0.05	42.0		35.5	38	34	208		300	42.20	60.3%	
LTP30	39.40	1.96		2.22	0.525	0.45	0.41	0.10	0.21	<0.05	<0.05	41.0	1.74	2.04	72	11	209		292	41.36	57.5%	
LTP41	31.36	9.48		0.85	0.563	0.27	0.30	0.07	0.18	0.16	<0.05	<0.05	42.5	1.20	2.32	87	60	194	20	361	40.84	60.0%
LTP6	29.83	10.45		3.34	0.565	0.21	0.32	0.05	0.15	<0.05	<0.05	40.2	1.89	2.76	65	52	172		289	40.28	59.0%	
LTP34	30.44	9.81		1.68	0.573	0.25	0.31	0.07	0.15	<0.05	<0.05	40.1	1.40	1.79	76	51	188		315	40.25	58.0%	
LTP43	30.51	9.68		1.68	0.5619	0.28	0.32	0.07	0.11	0.15	<0.05	<0.05	41.1	0.97	1.84	62	66	187	12	347	40.19	58.0%
LTP42	30.55	9.56		0.86	0.5713	0.27	0.31	0.07	0.18	0.15	<0.05	<0.05	41.1	1.04	1.81	75	65	192	12	344	40.12	58.2%
LTP47	22.2	17.4		3.98	0.552	0.31	0.31	0.05	0.15	<0.05	<0.05	39.3	1.97	2.14	58	104	197		359	39.60	61.0%	
LTP38	44.73	0.82		0.784	0.31	0.30	0.08	0.04	0.15	<0.05	<0.05	40.3	1.07	1.40	83	25	175	9	292	39.56	55.4%	
LTP2	33.35	16.10		4.87	0.5425	0.46	0.24	<0.05	0.16	0.38	<0.05	38.8	2.24	3.03	53	96	167		316	39.45	60.8%	
LTP9	24.35	4.73		1.67	0.739	0.27	0.30	0.08	0.16	0.14	<0.05	<0.05	40.0	1.47	1.33	52	33	203		348	39.08	55.2%
LTP1	23.29	15.66		3.33	0.701	0.24	0.22	0.06	0.14	<0.05	<0.05	38.7	1.31	1.77	63	89	175		337	38.94	58.7%	
LTP48	32	6.87		7.8	0.524	0.32	0.34	0.05	0.15	0.18	<0.05	38.2	1.24	1.53	84	48	205		337	38.87	57.7%	
LTP40	33.67	4.75		0.86	0.5785	0.38	0.31	0.08	0.15	0.15	<0.05	<0.05	40.0	1.15	2.39	40	32	194	25	312	38.25	54.0%
LTP26	33.69	4.56		3.73	0.5695	0.36	0.43	0.06	0.14	0.07	<0.05	38.0	1.22	1.40	91	28	193		312	38.25	54.0%	
LTP27	28.91	9.33		3.66	0.732	0.22	0.36	0.05	0.14	<0.05	<0.05	38.2	0.99	1.16	67	48	173		288	38.24	55.5%	
LTP46	28.4	8.69		2.67	0.39	0.33	0.06	<0.05	0.13	<0.05	<0.05	36.9	0.91	0.99	71	46	175		292	37.09	53.3%	

TABLE II (Part 1)

Code	Chemical Composition (XRF - Weight percent)										KI		Shrinkage		Solubility (g/gm)			% N.B.O.				
	CaO	MgO	P2O5	SiO2	Al2O3	Na2O	K2O	B2O3	Fe2O3	ZnO	SiO	800°C	1000°C	CaO	MgO	SiO2	Total					
LTP	24.95	19.18	3.41	51.69	0.25	0.30	0.05			0.17		43.59	40.00	40.00	-7.49	53	98	177	328	44.14	68.5%	
LTP8																						
LTP13	25.15	19.07	2.51	52.54	0.28	0.25	0.05			0.14		43.74	46.80	39.10	-7.48	55	94	174	329	44.20	62.0%	
LTP49	32.35	6.74	50.54	0.57	0.40	0.08	9.17	0.17	0.15			47.60	26.55	15.70	-7.46	79	41	214	423	39.09	68.0%	
LTP9	24.81	18.66	5.10	50.42	-0.38	0.31				0.17	0.15	43.03	23.90	38.80	-6.81	59	115	193	367	43.47	68.1%	
LTP17	15.17	23.18	5.06	54.00	0.19	0.25				0.15		49.22	5.70	-	-6.53					40.35	64.9%	
LTP11	11.28	27.95	3.26	57.20	0.13					0.17		39.36	5.72	5.26	-6.51	30	117	188	335	39.23	63.0%	
LTP62	14.59	24.54	2.52	57.24	0.35	0.19				0.16		39.02	4.48	-	-5.46	25	66	119	210	39.53	62.3%	
LTP7	10.77	20.83	3.29	58.18	0.17					0.16		38.37	10.90	15.50	-5.51	36	132	152	320	38.23	61.4%	
LTP10	24.48	17.89	2.48	54.46	0.21	0.28	0.05			0.16		42.28	3.62	19.10	-5.01	59	90	169	317	42.37	64.3%	
LTP14	24.04	17.78	3.31	53.85	0.31	0.26	0.05			0.15	0.25	41.52	3.71	4.77	-4.73	56	95	160	331	41.83	64.3%	
LTP16	31.83	12.27	3.39	51.59	0.26	0.42	0.06			0.17		44.07	49.10	-	-4.15	79	76	209	355	44.11	66.1%	
LTP5	24.12	17.17	4.17	52.72	0.31	0.36				0.14	0.21	41.04	3.63	5.39	-3.96	63	106	191	362	41.40	64.1%	
LTP59	32.33	10.47	12.93	41.37	0.31	0.50	0.05			0.17		38.59	43.20	-	-3.94	42	179	289	562	42.60	69.3%	
LTP10	30.40	10.40	5.50	0.36	0.31	0.08	3.19	0.16		0.16		44.26	29.80	-	-3.70	79	58	200	330	367	41.40	63.9%
LTP17	38.39	5.54	3.41	51.22	0.40	0.42	0.07			0.16	0.38	43.62	45.20	43.80	-3.37	83	32	191	306	43.94	63.9%	
LTP56	34.38	9.46	14.72	40.02	0.72	0.55				0.16		42.95	9.98	-	-3.26	60	57	196	313	43.84	70.5%	
LTP23	38.62	5.56	2.97	52.23	0.34	0.46	0.07			0.15		44.03	42.90	-	-3.20	82	29	199	310	44.18	63.7%	
LTP23	38.62	5.56	2.97	52.23	0.34	0.46	0.07			0.15		44.03	42.90	-	-3.20	82	29	199	310	44.18	63.7%	
LTP3	34.73	9.55	15.83	37.52	0.44	0.18				0.13		44.08	-	-	-2.93				0	44.28	71.0%	
LTP10	24.38	14.20	0.18							0.18		40.97	3.63	7.86	-2.58	75	73	255	424	38.58	58.7%	
LTP63	14.61	22.87	2.53	59.45	0.27	0.12				0.16		37.06	9.57	-	-2.46	17	108	83	208	37.48	58.4%	
Above here compositions have deviation of more than 2.4wt%																						
LTP54	29.40	8.73	14.55	46.68	0.07	0.44				0.13		38.43	-	-	3.23	-	-	-	38.13	60.1%		
LTP61	32.46	9.86	14.02	42.67	0.09	0.70	0.05			0.15		42.89	3.44	3.65	-1.31	-	-	-	42.32	67.4%		
LTP60	31.46	9.38	12.64	44.91	0.69	0.54	0.05			0.14		40.23	-	-	-0.45	-	-	-	41.04	64.8%		
Above here compositions have P2O5 content more than 12.5wt%																						
LTP52	24.93	11.52	4.90	54.88	2.06	0.28	0.05			0.138		32.66	32.10	-	1.02	-	-	-	286	56.1%		
LTP51	28.72	11.01	1.62	56.65	1.38	0.29	0.07			0.26		37.33	3.07	3.61	-0.24	-	-	-	310	58.4%		
Above here fibres have Al2O3 content above 1 wt%																						
LTP15	36.89	5.70	5.05	51.22	0.31	0.43	0.10			0.16		42.50	3.41	5.03	-1.72	-	-	-	327	42.59		
LTP14	30.93	11.01	4.90	51.96	0.30	0.45	0.05			0.15	0.25	41.85	3.24	3.92	-1.65	-	-	-	338	41.95		
LTP58	32.93	9.77	12.01	44.34	0.19	0.53	0.05			0.19		42.90	2.62	2.78	-1.65	-	-	-	322	42.70		
LTP55	32.58	9.47	9.65	46.79	0.84	0.46	0.05			0.17		40.88	1.72	1.95	-1.56	-	-	-	328	42.08		
LTP53	29.34	9.84	9.58	50.36	0.17	0.56	0.05			0.15	0.05	39.45	0.01	0.01	1.84	-	-	-	376	39.18		
Above here SiO2 content less than 52wt%																						

TABLE II (Part 2)

Code	Chemical Composition (NRE - Weight percent)										KI		Shrinkage		Solubility (ppm)		Total	B2O3	% N.B.O.
	CaO	MgO	P2O5	SiO2	Al2O3	Na2O	K2O	B2O3	Fe2O3	ZnO	SiO2	CaO	MgO	SiO2	CaO	MgO			
LTP3	22.89	16.69	6.70	52.58	0.25	0.29				0.14	0.46	43	166	141	43	166	350		61.3%
LTP20	31.05	11.35	2.52	54.14	0.32	0.31	0.06			0.16	0.10	85	71	200	85	71	356		62.6%
LTP2	23.35	16.10	4.87	54.25	0.46	0.24				0.16	0.58	38.77	2.24	3.05	53	96	316		60.8%
LTP12	30.93	11.35	3.36	53.52	0.32	0.31	0.06			0.15	0.15	82	72	207	82	72	361		62.6%
LTP21	36.62	5.58	2.54	54.10	0.39	0.46	0.07			0.15	0.15	58	34	206	58	34	300		60.3%
LTP48	31.90	6.85	7.78	52.24	0.52	0.34	0.05			0.15	0.18	84	48	205	84	48	337		57.7%
Above here SiO2 content 52.6% to less than 55.6%																			
LTP47	22.30	17.48	4.00	55.45	0.31	0.31	0.05			0.10	0.10	58	104	197	58	104	359		61.3%
LTP64	20.81	18.41	2.52	57.63	0.22	0.26				0.14	0.14	46	76	197	46	76	319		59.7%
LTP68	20.08	18.77	4.55	55.92	0.30	0.24				0.14	0.14	51	89	226	51	89	366		60.2%
LTP29	40.29	2.09	1.23	55.80	0.43	0.39	0.12			0.19	0.17	76	10	206	76	10	292		58.8%
LTP41	31.36	9.48	0.85	55.63	0.27	0.30	0.07	1.88		0.16	0.16	87	60	194	87	60	361		60.0%
LTP71	38.31	0.65	56.51	0.55	0.20	0.09	3.54			0.14	0.14	41.69	0.59	1.43	41.69	0.59	408		54.9%
LTP30	39.40	1.96	2.22	55.25	0.45	0.41	0.10			0.21	0.21	48.96	1.74	2.64	48.96	1.74	292		57.5%
LTP1	23.29	15.66	3.33	57.01	0.24	0.22	0.06			0.14	0.14	73	2	219	73	2	327		58.7%
LTP43	30.51	9.68	1.68	56.19	0.28	0.32	0.07	1.11		0.15	0.15	38.74	1.31	1.77	38.74	1.31	337		58.7%
LTP97	35.40	4.77	57.92	0.31	0.31	0.09	1.05			0.15	0.15	41.13	0.97	1.84	41.13	0.97	327		58.7%
LTP32	30.01	8.53	57.95	0.32	0.23	0.09	2.69			0.18	0.18	40.99	1.57	2.13	40.99	1.57	337		58.7%
LTP73	36.93	0.62	57.96	0.49	0.23	0.09	3.54			0.13	0.13	40.92	1.68	2.83	40.92	1.68	292		56.3%
LTP42	30.55	9.56	0.86	57.13	0.27	0.33	0.07	1.08		0.15	0.15	40.43	1.23	3.00	40.43	1.23	334		58.2%
LTP98	34.82	4.73	0.82	57.84	0.31	0.30	0.08	0.94		0.15	0.15	40.26	1.07	1.40	40.26	1.07	344		58.2%
LTP40	33.67	4.75	0.86	57.85	0.38	0.31	0.08	1.95		0.15	0.15	40.90	1.15	2.39	40.90	1.15	292		55.3%
LTP6	29.83	10.45	3.34	55.65	0.21	0.32	0.05			0.15	0.15	40.33	1.89	2.76	40.33	1.89	291		54.5%
LTP69	19.17	17.56	4.66	57.93	0.31	0.23				0.13	0.13	36.34	1.23	1.68	36.34	1.23	289		59.0%
LTP24	30.44	9.81	1.68	57.30	0.25	0.31	0.07			0.15	0.15	40.13	1.40	1.79	40.13	1.40	378		56.5%
LTP29	34.35	4.73	1.67	57.39	0.27	0.30	0.08	1.06		0.14	0.14	39.98	1.47	1.93	39.98	1.47	315		58.0%
LTP56	33.69	4.56	3.73	56.95	0.36	0.43	0.06			0.14	0.14	38.02	1.22	1.40	38.02	1.22	284		55.2%
LTP27	28.91	9.33	3.66	57.32	0.22	0.36	0.05			0.14	0.14	38.21	0.99	1.16	38.21	0.99	312		54.0%
Above here SiO2 content 53.6% to less than 56.6%																			
LTP77	28.91	9.33	3.66	57.32	0.22	0.36	0.05			0.14	0.14	67	48	173	67	48	288		58.5%

TABLE II (Part 3)

Code	Chemical Composition (XRF - Weight percent)										KI		Shrinkage		Solubility (g/m)			Total	CaO-MgO	% N.B.O.	
	CaO	MgO	P2O5	SiO2	Al2O3	Na2O	K2O	B2O3	Fe2O3	ZrO2	SiO	800°C	1000°C	Deviation	CaO	MgO	SiO2				
LTP	15.65	21.16	4.38	58.17	0.24	0.25			0.15			36.58	2.65	3.19	-1.03	30	84	169	283	36.81	57.7%
LTP66	15.65	21.16	4.38	58.75	0.30	0.22			0.13			37.72	2.28	2.37	-0.62	41	68	185	294	38.10	57.6%
LTP72	22.67	13.60	59.64	0.37	0.27	0.31			0.14			39.11	3.77	6.16	-0.16	49	56	197	23	32.5	55.0%
LTP35	32.72	4.76	58.60	0.28	0.31	0.08			0.15			40.40	1.65	3.85	0.60	88	26	179	29	32.2	53.5%
LTP31	28.30	9.20	58.70	0.28	0.29	0.06			0.18			40.29	3.15	4.88	0.70	91	60	205	31	38.7	55.1%
LTP66	33.37	4.82	58.90	0.27	0.30	0.08			0.15			40.13	1.50	3.12	0.90	37	33	198	25	39.3	53.9%
LTP33	30.20	9.03	59.01	0.27	0.28	0.08			0.17			40.02	2.16	2.71	1.01	88	52	193	10	34.3	56.1%
LTP44	29.05	6.88	59.81	0.35	0.36	0.07			0.13	0.19		38.82	1.60	2.71	1.81	89	44	193	32	35.8	52.1%
LTP45	24.10	11.40	62.48	0.54	0.24	0.06			1.04	0.15		35.76	2.17	3.15	3.78	81	65	189	10	34.5	51.3%
LTP46	28.52	8.73	59.25	0.29	0.33	0.06			0.13			37.06	0.91	0.99	3.93	71	46	175	292	37.25	53.3%

Above here SiO2 content 33% or more

Above base SiO2 content 58W% or more

CLAIMS

1. The use of either or both P_2O_5 and B_2O_3 as a component to improve the refractoriness of inorganic fibres comprising SiO_2 , and CaO and/or MgO, to produce inorganic fibres having a composition having a shrinkage of less than 3.5% when exposed to $1000^\circ C$ for 24 hours and having a shrinkage of less than 3.5% when exposed to $800^\circ C$ for 24 hours, the fibres having a composition:-

SiO_2	44wt% or more
CaO	20 - 40wt%
MgO	0 - 18wt%
P_2O_5	0- 12.5wt%
B_2O_3	0 - 4wt%

and in which

$$SiO_2 + P_2O_5 - (58 + (if\ MgO > 10, 0.5 \times (MgO - 10)\ else\ 0)) > - 2.4wt\%$$

2. The use of either or both P_2O_5 and B_2O_3 as a component to improve the refractoriness of inorganic fibres as claimed in claim 1 in which the percentage of non-bridging oxygens is less than 61.4%.
3. The use of either or both P_2O_5 and B_2O_3 as a component to improve the refractoriness of inorganic fibres as claimed in claim 1 in which the fibres fall within the compositional range:-

SiO_2	52 - <58wt% [52 - <58+0.5×(MgO-10)wt% if MgO > 10wt%]
CaO	22 - 40wt%
MgO	0 - 17.5wt%
MgO + CaO	< 42wt%
P_2O_5	0.5 - 10wt%
B_2O_3	0 - 2wt%

4. The use of either or both P_2O_5 and B_2O_3 as a component to improve the refractoriness of inorganic fibres in which the fibres fall within the compositional range:-

SiO_2	44.34 - 62.48
CaO	20.36 - 39.4wt%
MgO	0.62 - 21.16wt%
P_2O_5	0 - 12.01wt%
B_2O_3	0 - 3.54wt%

and in which

$$SiO_2 + P_2O_5 - (58 + (if MgO > 10, 0.5 \times (MgO - 10) \text{ else } 0)) > - 2.4wt\%$$

5. Saline soluble inorganic fibres having a shrinkage of less than 3.5% when exposed to 1000°C for 24 hours and having a shrinkage of less than 3.5% when exposed to 800°C for 24 hours, in which:-

$$SiO_2 + P_2O_5 - (58 + (if MgO > 10, 0.5 \times (MgO - 10) \text{ else } 0)) > - 2.4wt\%$$

and comprising:-

SiO_2	52 - <58wt% [52 - <58+0.5'(MgO-10)wt% if MgO > 10wt%]
CaO	22 - 40wt%
MgO	0 - 17.5wt%
$MgO + CaO$	< 42wt%
P_2O_5	0.5 - 10wt%
B_2O_3	0 - 2wt%

and in which the percentage of non-bridging oxygens calculated on the basis of the amounts of the above named components is less than 61.4%.

6. Saline soluble inorganic fibres having a shrinkage of less than 3.5% when exposed to 1000°C for 24 hours and having a shrinkage of less than 3.5% when exposed to 800°C for 24 hours, in which:-

$$SiO_2 + P_2O_5 - (58 + (if MgO > 10, 0.5 \times (MgO - 10) \text{ else } 0)) > - 2.4wt\%$$

and comprising:-

SiO_2	44.34 - 62.48
CaO	20.36 - 39.4wt%
MgO	0.62 - 21.16wt%

and also comprising either or both of:-

P_2O_5	0 - 12.01wt%
B_2O_3	0 - 3.54wt%

7. Saline soluble inorganic fibres having a shrinkage of less than 3.5% when exposed to 1000°C for 24 hours and having a shrinkage of less than 3.5% when exposed to 800°C for 24 hours, in which:-

$\text{SiO}_2 + \text{P}_2\text{O}_5 - (58 + (\text{if MgO} > 10, 0.5 \times (\text{MgO} - 10) \text{ else } 0)) > -2.4\text{wt}\%$

and comprising:-

SiO_2	52.4 - 57.85wt%
CaO	22.2 - 39.4wt%
MgO	1.96 - 17.4wt%
P_2O_5	0.82 - 7.8wt%
B_2O_3	0 - 1.95wt%
Al_2O_3	<1wt%

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

the specification of which (check only one item below):

- ☐ is attached hereto
- ☐ was filed as United States application
Serial No. _____
on _____
and was amended
on _____ (if applicable).
- ☒ was filed as PCT international application
Number **PCT/GB97/01667**
on **20th June 1997**,
and was amended under PCT Article 19
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United State code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (of PCT indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
United Kingdom	9613023.2	21 June 1996	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

PTO 1391 (rev 10/83)

Page 1 of 2

US DEPARTMENT OF COMMERCE Patent and Trademark Office

(Combined Declaration For Patent Application and Power of Attorney --PTO 1391 [13-11]--page 1 of 2)

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONTINUED) (Includes Reference to PCT International Applications)				ATTORNEY DOCKET NUMBER																										
<p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:</p> <p>PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th colspan="2" style="text-align: center;">U.S. APPLICATIONS</th> <th colspan="3" style="text-align: center;">STATUS (Check One)</th> </tr> <tr> <th style="text-align: center;">U.S. APPLICATION NUMBER</th> <th style="text-align: center;">U.S. FILING DATE</th> <th style="text-align: center;">PATENTED</th> <th style="text-align: center;">PENDING</th> <th style="text-align: center;">ABANDONED</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center; padding: 5px;">PCT APPLICATIONS DESIGNATING THE U.S.</td> </tr> <tr> <th style="text-align: center;">PCT APPLICATION NO</th> <th style="text-align: center;">PCT FILING DATE</th> <th style="text-align: center;">U.S. SERIAL NUMBERS ASSIGNED (if any)</th> <th></th> <th></th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>						U.S. APPLICATIONS		STATUS (Check One)			U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED	PCT APPLICATIONS DESIGNATING THE U.S.					PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)							
U.S. APPLICATIONS		STATUS (Check One)																												
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED																										
PCT APPLICATIONS DESIGNATING THE U.S.																														
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)																												
<p>POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (<i>List name and registration number</i>) Charles Y. Lackey 22,707; John M. Harrington 25,592; John S. Pratt 29,476; James L. Ewing, IV 30,630; Roy D. Meredith 30,777; Charles W. Calkins 31,814; Michael D. Bednarek 32,329; Dale Curtis Hogue, Sr. 32,823; George T. Marcon 33,014; Sherry M. Knowles 33,052; Dean W. Russell 33,452; Richard A. Clegg 33,485; Andrew Knowles 33,525; Richard T. Peterson 35,320; Charles T. Simmons 35,359; Bruce D. Gray 35,799; Theodore R. Harper 35,890; Geoff L. Sutcliffe 36,348; George C. Beck 38,072; Nagendra Setty 38,300; Nancy Talavera Wood 38,334; Mike S. Ryu 38,604; Mitchell G. Stockwell 39,389; Michael F. Labbee 39,738; Mitchell G. Weatherly 340,864</p>																														
<p>Send Correspondence to: John S. Pratt, Esq. Kilpatrick Stockton LLP 1100 Peachtree Street, Suite 2800 Atlanta, GA 30309-4530</p>				<p>Direct Telephone Calls to: <i>name and telephone number</i></p>																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																										
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP																										
1	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	STATE & ZIP CODE/COUNTRY																										
<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.</p>																														
SIGNATURE OF INVENTOR 201			SIGNATURE OF INVENTOR 202																											
DATE 15/12/98			DATE 15/12/98																											
SIGNATURE OF INVENTOR 203			SIGNATURE OF INVENTOR 204																											
DATE 15-12-98			DATE 15.12.98																											